

LISTING OF CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application.

1. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture, comprising:

a filament;

an anchor for insertion through the tissue wall puncture attached to the filament at a first end of the closure device;

a sealing plug disposed proximal of the anchor;

a locking apparatus separate from the filament, anchor, and sealing plug and arranged adjacent to the sealing plug for compressing the sealing plug along the filament toward the anchor, wherein the locking apparatus comprises a ratchet mechanism, the ratchet mechanism including a first member that maintains a fixed position relative to the filament and terminates proximal of a distal end of the filament, and a second member that is movable along the filament relative to and in contact with the first member and configured to apply a pressure to the sealing plug to form a seal between the tissue wall puncture and the sealing plug, wherein the pressure is insufficient to push the sealing plug through a portion of the internal tissue wall puncture.

2. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the locking apparatus comprises a strap and hub attached to the filament.

3. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 2 wherein the strap and hub comprise the ratchet mechanism.

4. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 3 wherein the strap comprises an elongated track and a plurality of sloping teeth.

5. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 3 wherein the strap comprises a shoulder stop limiting movement of the hub.

6. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 3 wherein the hub comprises a nut having a flexible internal finger biased to engage a plurality of sloping teeth.

7. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 6 wherein the flexible internal finger comprises a notch or an external corner shaped to mate a surface of the plurality of sloping teeth.

8. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 6 wherein the flexible internal finger of the hub freely traverses the sloping teeth in degrees in a first direction, but is prevented from traversing the sloping teeth in a second direction.

9. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 2, further comprising a tube slidably disposed about the filament proximal to the hub for advancing the hub along the strap.

10. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 9 wherein the tube comprises an outer diameter that is larger than an inner diameter of the hub.

11. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 2 wherein the sealing plug is initially disposed over an outer diameter of the strap.

12. (Previously Presented) A tissue puncture sealing device comprising:

an internal component configured to be positioned against an internal wall of a lumen;

an external component configured to be positioned external to the lumen;

a filament attached to the internal component, the external component being slidable along the filament toward the internal component;

a locking apparatus that is separate from the internal and external components and the filament, the locking apparatus being configured to compress and hold the internal and external components together, wherein the locking apparatus comprises a ratchet mechanism, the ratchet mechanism including a first member that maintains a fixed position relative to the filament and the internal component, and a second member that is movable relative to and in contact with the external component and configured to apply a pressure to the external component to form a seal between the lumen and the external component, wherein the pressure is insufficient to push the external component through a portion of the lumen;

wherein the filament provides a pivotal connection of the internal component to the first member distally of the ratchet mechanism.

13. (Previously Presented) A tissue puncture sealing device according to claim 12 wherein the tissue puncture is an arteriotomy.

14. (Original) A tissue puncture sealing device according to claim 12 wherein the internal component is an anchor and the external component is a collagen sponge.

15. (Original) A tissue puncture sealing device according to claim 12 wherein the locking apparatus comprises a strap and hub.

16. (Previously Presented) A tissue puncture sealing device according to claim 15 wherein the strap and hub comprise the ratchet mechanism.

17. (Original) A tissue puncture sealing device according to claim 16 wherein the strap comprises an biologically resorbable elongated track and a plurality of sloping teeth.

18. (Original) A tissue puncture sealing device according to claim 17 wherein the hub comprises a nut having a flexible internal finger biased to engage the plurality of sloping teeth.

19. (Original) A tissue puncture sealing device according to claim 15, further comprising a tube slidably disposed adjacent to the hub for pushing the hub along the strap.

20. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of a puncture in a vessel wall, comprising:

an carrier tube having first and second ends;

an anchor disposed outside of the carrier tube at the first end thereof;

a sealing plug disposed inside the carrier tube at the first end thereof;

a filament attached to the anchor and the sealing plug being slidable along the filament toward the anchor;

a one-way lock disposed at the first end of the carrier tube for compressing the sealing plug toward the anchor, the one-way lock being separate from the carrier tube, anchor, filament, and sealing plug, wherein the one-way lock comprises a ratchet mechanism, the ratchet mechanism including a first member that maintains a fixed position relative to the anchor, and a second member that is movable relative to and in contact with the first member to compress the sealing plug toward the anchor to seal the puncture without allowing the sealing plug to be forced into an interior region of the vessel;

wherein the filament provides a pivotal connection of the anchor to the first member distally of the ratchet mechanism.

21. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 20, further comprising a filament attaching the anchor to the one-way lock.

22. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 20 wherein the one-way lock is disposed within the first end of the carrier tube, and wherein the sealing plug is slidably arranged about the one-way lock.

23. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 20 wherein the one-way lock comprises the ratchet mechanism.

24. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 20 wherein the ratchet mechanism comprises a strap and hub.

25. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 24 wherein the strap comprises a plurality of sloping teeth.

26. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 25 wherein the hub comprises a nut having a flexible internal finger biased to engage one or more of the plurality of sloping teeth.

27. (Original) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 20 wherein the anchor, sealing plug, and one-way lock comprise biologically resorbable materials.

28. (Previously Presented) A tissue puncture closure assembly for partial insertion into and sealing of an internal tissue wall puncture, comprising:

an insertion sheath receptive of a closure device;

the closure device, comprising:

a carrier tube;

a filament extending at least partially through the carrier tube;

an anchor for insertion through the internal tissue wall puncture attached to the filament at a first end of the closure device;

a strap and locking hub attached to the filament adjacent to the anchor, the hub being movable along and in contact with the strap in a first direction, but locked from moving opposite of the first direction;

a sealing plug disposed at least partially about the strap and adjacent to the locking hub, wherein the strap and hub comprise a ratchet mechanism configured to apply a pressure to the sealing plug to compress the sealing plug along the strap toward the anchor to form a seal between the tissue wall puncture and the sealing plug, wherein the pressure is insufficient to push the sealing plug through a portion of the internal tissue wall puncture;

wherein the strap and locking hub are separate from the filament, anchor and sealing plug and are positioned proximal of the anchor and a distal end of the filament.

29. (Original) A tissue puncture closure assembly for partial insertion into and sealing of an internal tissue wall puncture according to claim 28 wherein the insertion sheath further comprises a one-way valve at a first end and a hemostatic valve at a second end.

30. (Original) A tissue puncture closure assembly for partial insertion into and sealing of an internal tissue wall puncture according to claim 28 wherein the closure device further comprises a tube slidably disposed about the filament adjacent to the locking hub for pushing the hub along the strap in the first direction.

31. (Withdrawn) A method of sealing an internal tissue puncture, comprising:
providing a closure device having an anchor for insertion through the tissue puncture, a sealing plug disposed proximal of the anchor, and a locking apparatus arranged adjacent to the sealing plug for lockingly compressing the sealing plug toward the anchor;

inserting the closure device partially into the internal tissue puncture;

deploying the anchor;

compressing the sealing plug and the anchor across the internal tissue puncture;

locking the sealing plug and the anchor into a fixed position relative to one another.

32. (Withdrawn) A method of sealing an internal tissue puncture according to claim 31, further comprising inserting the closure device into an insertion sheath.

33. (Withdrawn) A method of sealing an internal tissue puncture according to claim 31 wherein the compressing of the sealing plug further comprises advancing a one-way hub of the locking apparatus along a strap of the locking apparatus.

34. (Withdrawn) A method of sealing a puncture in an internal tissue wall accessible through a percutaneous incision, comprising:

inserting a closure device at least partially into the percutaneous incision;

advancing a one-way hub along a strap;

compressing a sealing plug toward the puncture by the advancing of the one-way hub along the strap.

35. (Withdrawn) A method of sealing a puncture in an internal tissue wall accessible through a percutaneous incision according to claim 34 wherein the compressing further comprises sandwiching the sealing plug and an anchor across the puncture.

36. (Withdrawn) A method of sealing a puncture in an internal tissue wall accessible through a percutaneous incision according to claim 34 wherein the advancing further comprises traversing a biased finger across a plurality of sloped teeth of the strap, wherein the biased finger and sloped teeth allow advancement of the hub, but preclude retracting of the hub.

37. (Withdrawn) A method of sealing a puncture in an internal tissue wall accessible through a percutaneous incision according to claim 34 wherein the inserting further comprises passing the closure device through an insertion sheath and deploying an anchor internal to the puncture.

38. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the anchor is pivotally attached to the filament.

39. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the filament comprises a single strand extending through the sealing plug and attached at a distal end to the anchor.

40. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the first member is molded around the filament.

41. (Previously Presented) A tissue puncture closure device for partial insertion into and sealing of an internal tissue wall puncture according to claim 1 wherein the first member is connected to the filament at a location spaced between distal and proximal ends of the filament.